

1 This listing of claims will replace all prior versions, and listings, of claims
2 in the application:

3

4 **Listing of Claims**

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6 **Claim 1 (Canceled)**

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8 *Sab* **Claim 2 (Previously presented):** A method comprising:
9 initiating a search for images based on at least one query keyword in a
10 query;
11 identifying, during the search, first images having associated keywords that
12 match the query keyword and second images that contain low-level features
13 similar to those of the first images; and
14 ranking the first and second images.

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16 **Claim 3 (Previously presented):** A method as recited in claim 2, further
17 comprising presenting the first and second images.

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1 *SAC* 3.
2 Claim 4 (Previously presented): A method comprising:
3 initiating a search for images based on at least one query keyword in a
4 query;
5 identifying, during the search, first images having associated keywords that
6 match the query keyword and second images that contain low-level features
7 similar to those of the first images;
8 presenting the first and second images to a user; and
9 monitoring feedback from the user as to which of the first and second
10 images are relevant to the query.

11 4.
12 Claim 5 (Previously presented): A method comprising:
13 initiating a search for images based on at least one query keyword in a
14 query;
15 identifying, during the search, first images having associated keywords that
16 match the query keyword and second images that contain low-level features
17 similar to those of the first images;
18 presenting the first and second images to a user;
19 receiving feedback from the user as to whether the first and second images
20 are relevant to the query; and
21 learning how the first and second images are identified based on the
22 feedback from the user.

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1 Claim 6 (Previously presented): A method as recited in claim 2, wherein
2 the monitoring comprises

3 presenting the first and second images to a user;

4 receiving feedback from the user as to whether the first and second images
5 are relevant to the query further comprising:

6 refining the search to identify additional images that contain low-level
7 features similar to those of the images indicated by the user as being relevant to the
8 query.

9 6.

10 Claim 7 (Previously presented): A method as recited in claim 2, wherein
11 the monitoring comprises

12 presenting the first and second images to a user;

13 receiving feedback from the user as to whether the first and second images
14 are relevant to the query further comprising:

15 assigning a large weight to an association between the query keyword and
16 the images deemed relevant by the user.

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18 Claim 8 (Original): A method as recited in claim 7, further comprising
19 grouping the low-level features of the images deemed relevant by the user.

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1 Claim 9 (Previously presented): A method as recited in claim 2, wherein
2 the monitoring comprises
3 presenting the first and second images to a user;
4 receiving feedback from the user as to whether the first and second images
5 are relevant to the query further comprising:
6 assigning a small weight to an association between the query keyword and
7 the example image.

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9 Claim 10 (Original): A method as recited in claim 9, further comprising
10 identifying additional images with low-level features similar to those of the
11 example image.

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13 Claim 11 (Previously presented): A computer readable medium having
14 computer-executable instructions that, when executed on a processor, perform the
15 method as recited in claim 2.

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17 Claim 12 (Original): A method comprising:
18 permitting entry of both keyword-based queries and content-based queries;
19 finding images using both semantic-based image retrieval and low-level
20 feature-based image retrieval;
21 presenting the images to a user so that the user can indicate whether the
22 images are relevant; and
23 conducting semantic-based relevance feedback and low-level feature-based
24 relevance feedback in an integrated fashion.

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1 Claim 13 (Original): A method as recited in claim 12, further comprising
2 ranking the images.

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4 Claim 14 (Original): A method as recited in claim 12, further comprising
5 using images indicated as being relevant to find additional images.

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7 Claim 15 (Original): A computer readable medium having computer-
8 executable instructions that, when executed on a processor, perform the method as
9 recited in claim 12.

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11 Claims 16-19 (Canceled)

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13 ~~Claim 20 (Original): A method comprising:~~
14 ~~presenting a result set of images that are returned from an image retrieval~~
15 ~~search of a query having at least one keyword;~~

16 ~~monitoring feedback from a user as to whether the images in the result set~~
17 ~~are relevant to the query;~~

18 ~~in an event that the user selects at least one image as being relevant to the~~
19 ~~query, associating the keyword in the query with the selected image to form a first~~
20 ~~keyword-image association and assigning a comparatively large weight to the first~~
21 ~~keyword-image association; and~~

22 ~~in an event that the user identifies an example image for refinement of the~~
23 ~~search, associating the keyword in the query with the example image to form a~~
24 ~~second keyword-image association and assigning a comparatively small weight to~~
25 ~~the second keyword-image association.~~

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2 Claim 21 (Original): A method as recited in claim 20, further comprising
3 conducting both content-based image retrieval and semantic-based image retrieval.

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5 Claim 22 (Original): A method as recited in claim 20, further comprising
6 presenting the result set of images in a user interface, the user interface facilitating
7 the user feedback by allowing the user to indicate which images are more relevant
8 and which images are less relevant.

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10 Claim 23 (Original): A computer readable medium having computer-
11 executable instructions that, when executed on a processor, perform the method as
12 recited in claim 20.
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14 Claim 24 (Previously presented): A method comprising:
15 computing, for each category, a representative feature vectors of a set of
16 existing images within the category;
17 determining a set of ~~representative~~ keywords that are associated with the
18 existing images in each category;
19 comparing, for each new image, the low-level feature vectors of the new
20 image to the representative feature vectors of the existing images in each category
21 to identify a closest matching category; and
22 labeling the new image with the set of representative keywords associated
23 with the closest matching category.

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2 Claim 25 (Previously presented): A method as recited in claim 24, further
3 comprising using user feedback to selectively add and/or remove keywords from
4 the new image.

5 Claim 26 (Original): A method as recited in claim 24, further comprising:
6 placing the labeled new images into a holding category;
7 evaluating the labeled new images in the holding category to determine if
8 any of the keywords associated with the labeled new image match the
9 representative keywords from each category; and
10 assigning the labeled new image to the category that best matches the
11 keywords associated with the labeled new image.

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13 Claim 27 (Canceled)

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15 Claim 28 (Previously presented): An image retrieval system comprising:
16 a query handler to handle both keyword-based queries having one or more
17 search keywords and content-based queries having one or more low-level features
18 of an image; and
19 a feature and semantic matcher to identify at least one of (1) first images
20 having keywords that match the search keywords from a keyword-based query, and
21 (2) second images having low-level features similar to the low-level features of a
22 content-based query, wherein the feature and semantic matcher ranks the images.

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24 Claim 29 (Previously presented): An image retrieval system as recited in
25 claim 28, wherein the query handler comprises a natural language parser.

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3 Claim 30 (Previously presented): An image retrieval system as recited in
4 claim 28, wherein the query handler comprises:
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a parser to parse text-based queries; and
a concept hierarchy to define various categories of images.

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7 19 Claim 31 (Previously presented): An image retrieval system as recited in
8 claim 28, further comprising a user interface to present the images identified by the
9 feature and semantic matcher.

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11 Sub Dk Claim 32 (Previously presented): An image retrieval system comprising:
12 a query handler to handle both keyword-based queries having one or more
13 search keywords and content-based queries having one or more low-level features
14 of an image;
15 a feature and semantic matcher to identify at least one of (1) first images
16 having keywords that match the search keywords from a keyword-based query, and
17 (2) second images having low-level features similar to the low-level features of a
18 content-based query;
19 a user interface to present the images identified by the feature and semantic
20 matcher to a user, the user interface allowing the user to indicate whether the
21 images are relevant to the query; and
22 a feedback analyzer to train the image retrieval system based on user
23 feedback as to relevancy.
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1 19 Claim 33 (Previously presented): An image retrieval system as recited in
2 claim 28, further comprising:

3 a user interface to present the images identified by the feature and semantic
4 matcher to a user, the user interface allowing the user to identify an example
5 image; and

6 the feature and semantic matcher being configured to identify additional
7 images that contain low-level features similar to those of the example image.

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9 19 Claim 34 (Previously presented): An image retrieval system as recited in
10 claim 28, further comprising:

11 a user interface to present the images identified by the feature and semantic
12 matcher to a user, the user interface allowing the user to identify which images are
13 relevant to a particular search query; and

14 a feedback analyzer to assign a large weight to an association between the
15 search keywords and the images identified as relevant by the user.

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17 19 Claim 38 (Original): An image retrieval system as recited in claim 24,
18 wherein the feedback analyzer groups the low-level features of the images
19 identified as relevant by the user.

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1 Claim 36 (Previously presented): An image retrieval system as recited in
2 claim 28, further comprising:

3 a user interface to present the images identified by the feature and semantic
4 matcher to a user, the user interface allowing the user to identify an example image
5 as being less relevant or irrelevant to the query; and

6 a feedback analyzer to assign a small weight to an association between the
7 search keywords and the example image.

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9 Claim 27 (Original): An image retrieval system as recited in claim 36,
10 wherein the feature and semantic matcher identifies additional images with low-
11 level features similar to those of the example image.

12 Claim 38 (Canceled)

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14 Claim 39 (Previously presented): A computer-readable medium having
15 computer-executable instructions that, when executed, directs a computer to:

16 find images using both semantic-based image retrieval and low-level
17 feature-based image retrieval;

18 present the images to a user so that the user can indicate whether the images
19 are relevant; and

20 concurrently conduct semantic-based relevance feedback and low-level
21 feature-based relevance feedback.

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1 Claim 40 (original): A program as recited in claim 39, further comprising
2 computer-executable instructions that, when executed, direct a computer to rank
3 the images.

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5 Claim 41 (Original): An information retrieval program, embodied on the
6 computer-readable medium, comprising the computer-executable instructions of
7 claim 39.

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9 Claim 42 (Previously presented): A computer readable medium having
10 computer-executable instructions that, when executed on a processor, perform the
11 method as recited in claim 4.